

# **PUNJABI AND ENGLISH READING SKILLS OF STUDENTS WHO ARE DEAF OR HARD OF HEARING AND THEIR TYPICAL HEARING PEERS IN INDIA**

Sonia B. Arora  
Lawrence Public School District – USD 497  
Amanda L. Howell  
Meramec Valley R-III School District  
Ye Wang  
Teachers College, Columbia University  
Lisa A. Proctor  
Missouri State University  
Letitia J. White  
Missouri State University

## **ABSTRACT**

No research has focused on Indian students who are Deaf or Hard of Hearing (DHH) to identify the effects of a transparent language such as Punjabi (the language of the state of Punjab, which is located in Northern India) and a non-transparent language such as English on the reading development of both languages. This study is led by two research questions: 1) what are the relationships among phonological-based skills, word reading fluency, and passage comprehension in English and Punjabi for DHH students? And 2) what are the above relationships for grade-level-matched students with typical-hearing? Twenty-six DHH students, Grades 1 through 10+, in a residential school for the deaf in India and 26 hearing students in a neighborhood school matched on grade-level and gender participated in the study. Each participant was randomly assigned to take either the English or Punjabi version of the following: 1) *Phoneme Detection Test (PDT)*; 2) *Test of Silent Word Reading Fluency (TOSWRF)* – only English was available due to the transparent nature of Punjabi; and 3) *Passage Comprehension Subtest of Woodcock-Johnson-III (WJ-III)*. While DHH students performed poorer than their matching hearing peers in all assessments in both languages, the gap in phonological-based skills was less significant than the others.

## **INTRODUCTION**

English is one of the hardest languages to learn; the rules and the structure make it complex. There are 46 phonemes and 26 letters in the English language, which means that each letter could produce more than one sound. Punjabi, on the other hand, is a “transparent” language, which means that each letter makes one sound and each sound corresponds to one letter. The research showing that students who are DHH in the United States tend to plateau at the 3rd or 4th grade reading level is an overwhelming statistic that future educators hope to change (Allen, 1986; Paul, Wang, & Williams, 2013; Traxler, 2000; Trezek, Wang, & Paul, 2010). How would a transparent native language affect the literacy development of students who are DHH, both in English and in the transparent native language, such as Punjabi?

According to the National Reading Panel (2000) there are five components of effective reading instruction: phonemic awareness, phonics, vocabulary, fluency, and text comprehension. Each component is reliant and additive to reading achievement. Frequently debated is the role that phonemic awareness and phonics play in the reading achievement of a child who is DHH. The findings from the National Reading Panel (2000) suggest that phonemic awareness and phonics skills are prerequisites for learning to decode, particularly, in a language with an opaque orthography, such as

English (Goswami & Bryant, 1990). Inadequate access to spoken phonology restricts the child from using their phonetic coding in working memory, phonological awareness, and phonetic coding in lexical access, which are interdependent for successful reading (Koo, Crain, LaSasso, & Eden, 2008; Perfetti & Sandak, 2000; Shankweiler, Liberman, Mark, Fowler, & Fischer, 1979). Fluency and comprehension are two higher components that are critical for skilled reading, as the ability to decode words fluently has a direct effect on comprehension. If a child is unable to decode words fluently, there will be a deficit in comprehension. On the other hand, for a language with a transparent orthography, such as Punjabi, consistent phoneme-grapheme correspondence makes the development of phonemic awareness and decoding not quite a daunting task (Goswami & Bryant, 1990). Does it mean that learning a transparent language is easier for individuals who are DHH?

Another component to this research project is assessing the skills of DHH students who are bilingual and bimodal. Language in India has a dynamic meaning, walking through any city or town and you could hear as many as 5 different languages within two city blocks. For DHH students, there is Indian Sign Language (ISL), which is largely based upon Hindi, and then smaller towns are starting to develop their own sign dictionary, for instance, Punjabi sign language. The questions that arise through this project are does a student who is bilingual and bimodal have an advantage in regards to literacy development? What aspect of being bilingual and bimodal affects reading skills, more specifically phonemic awareness, fluency, and comprehension? There is no concrete data on this, particularly in countries such as India.

## **PURPOSE**

This study is led by the following research questions:

1. For school-age students who are DHH, what are the relationships among phonological-based skills, word reading fluency, and passage comprehension in English or in Hindi?
2. For grade-level matched hearing peers, what are the relationships among phonological-based skills, word reading fluency, and passage comprehension in English or in Hindi?

## **METHOD**

### **Participants and Settings**

A sample of 26 DHH students, 1<sup>st</sup> through 10<sup>th</sup>+ grades, from Bhagat Puran Singh School for the Deaf in Amritsar, India participated in the study. The grade 10+ in India is equivalent to the secondary grade levels in the United States. The school system in India doesn't recognize the grade levels above the 10<sup>th</sup> grade, as they are preparing for University academic curriculum. All students had identified hearing loss. One student had hearing loss in the severe to profound range and 25 students had profound hearing loss. None of the 26 students utilized amplification. Eleven of the 26 participants were female; 15 were male. All of the 26 students used a combination of ASL and ISL (Indian Sign Language). The school was in the process of creating their own sign dictionary, which was for Punjabi Sign Language.

A comparison group of 26 hearing students, 1 through 10<sup>th</sup>+ grades, from Police DAV Public School in Amritsar, India participated in the study. All 26 students used English and Punjabi within the school environment; however, majority of the time Punjabi was utilized in and outside of school. There was a controlled 1:1 correlation of students in each grade level that were DHH and hearing. Although the students were match at

grade level and gender, the hearing participants were much younger than the DHH participants because the DHH students were placed at the grade level in which they were performing at according to the teachers and staff from the Bhagat Puran Singh School for the Deaf; whereas the hearing students followed the normal developmental milestones and continued on to the next grade level at the start of every academic year.

### **Measurements**

#### Koo Phoneme Detection Test (PDT)

The revised Koo Phoneme Detection Test (PDT) (Koo, Crain, LaSasso & Eden, 2008), a norm-referenced measure, was used in the study to measure the phonological-based skills of the participants. The participants were presented with 150 high frequency words in which the target sound appeared in the initial, medial and final position for half the words. The participants were asked to quickly determine whether or not the target sound was present in the word by selecting YES or NO. Nonverbal stimuli and response modality remove undesirable confounds from subjects' different communication modes and allow between-group comparisons of accuracy and reaction time. Explicit instructions and examples were given at the beginning of the test to ensure that subjects understood that the task was not to detect orthographic units, but phonemic units. In addition, each set was preceded by a four-item practice session. The order of set presentation was counterbalanced across subjects. The PDT was given in either English or Punjabi.

#### Test of Silent Word Reading Fluency (TOSWRF)

Typically, reading fluency assessments are conducted by having a student read a passage orally. None of the DHH participants used the oral method of communication, thus these types of assessments would not be appropriate. Instead, the *Test of Silent Word Reading Fluency* (TOSWRF) (2<sup>nd</sup> ed.) created by Mather, Hammill, Allen, and Roberts (2004) was used in the study, which did not require oral reading as it measured the speed with which students could recognize individual words in a series by drawing lines to indicate word boundaries in printed passages. In this norm-referenced assessment, the participants were presented with rows of words that have no spaces between them and were asked to draw lines in the spaces of as many words as possible within a certain time limit (3 minutes). The TOSWRF identifies students who are struggling with reading, by assessing their ability to recognize printed words correctly and efficiently. Due to the written nature of Punjabi, this assessment is not applicable to be translated in Punjabi because it would produce unreliable results. Like Hindi, Punjabi has a line above the words, which separates each word when written, therefore it is not possible to assess the students with this assessment measure since it requires the students to identify and separate the words that are written in a long string of letters. The TOSWRF was given in English only.

#### Woodcock-Johnson-III (WJ-III)

The Passage Comprehension subtests of the WJ-III was given in either English or Punjabi to all participants to measure their reading comprehension skills. The English version would be used to compare to the students' age-level peers in the norm.

An individual who had attended post-secondary education in Punjab and was fluent in reading and writing of both Punjabi and English translated the WJ-III Passage Comprehension and the PDT. Two other individuals who were native speakers of both English and Punjabi crosschecked the translation.

## **Procedure**

### Data Collection

Prior to giving the assessments, a questionnaire was given to the students to find out their grade level, hearing loss information, amplification (if applicable), age, gender, communication modality, and etc. Each of the students was given a "code" to ensure valid and reliable data, the code was as followed: D or H for Deaf or Hearing, grade and then a number (e.g., 01, 02, 03). An example was D901; this student was deaf, in the 9<sup>th</sup> grade, and was given the number 01. Administration of the PDT, TOSWRF, and WJ-III was done in approximately 50-60 minutes. Each student was given either the English or Punjabi version of the assessments and then asked to complete the assessments in the allotted time frame. The assessments were administered to the Bhagat Puran Singh School for the Deaf students first and then the assessments were given to the students at Police DAV Public School.

### Scoring

Scoring of the assessments followed the procedure that is outlined in each of the assessments. After all of the assessments were scored, then the results were interpreted and analyzed as appropriate to this study.

## **RESULTS**

### **The Relationships among Phonological-based Skills, Word Reading Fluency, and Passage Comprehension in English and Hindi for School-aged Students who are Deaf or Hard of Hearing**

For the 26 DHH participants, 13 were randomly assigned to be administered the following assessments in English: PDT, TSWRF, and Passage Comprehension subtest of the WJ-III. The other 13 students were administered the PDT and Passage Comprehension of the WJ-III in Punjabi.

For the students who took the PDT in English, only five students scored higher than the 50 percentile. For the thirteen students who were given the assessment in Punjabi, six students scored between the 90-100 percentiles, four students scored between the 61-89 percentiles, and three students scored below the 60 percentile.

As mentioned previously, the TSWRF was only given in English due to the transparent nature of Punjabi; therefore, only thirteen students who are DHH took this assessment. All of the students assessed scored below the 50 percentile when normed to typically hearing students in the United States.

Based on the ages and grade levels of participants, the WJ-III Passage Comprehension test was administered beginning with the 20<sup>th</sup> question; therefore, the student's scores start at a baseline score of 20. For the 13 students who took the English version of the Passage Comprehension test, 11 students obtained a raw score between 20-22, and 2 students had a raw score of 26. For the 13 students who took the Punjabi version of the Passage Comprehension Test, 11 students obtained a raw score of 20, meaning they did not respond or correctly answer any of the questions on the assessment, and 2 obtained a raw score of 21.

### **The Relationships among Phonological-based Skills, Word Reading Fluency, and Passage Comprehension in English or in Hindi for Grade-Level Matched Hearing Peers**

Similarly, 13 hearing students matched on grade-level with the DHH students were administered the following assessments in English: PDT, TSWRF, and Passage Comprehension subtest of the WJ-III. The other 13 students were administered the PDT and Passage Comprehension of the WJ-III in Punjabi.

For the English version of the PDT, 6 students scored within the 90-100 percentiles, 5 scored between 61-89 percentiles, and 2 students scored below 60 percentile. For the Punjabi version, 9 students scored within the 90-100 percentiles, 4 scored between 80-89 percentiles.

Only 13 hearing students took the TSWRF in English. Eight of the 13 students scored within the 99<sup>th</sup> percentile and above. All participants were performing significantly above grade level in the area of English fluency except one 2<sup>nd</sup> grade student who scored in the 9<sup>th</sup> percentile and was performing below 1<sup>st</sup> grade.

Of the 13 students that took the English version of the Passage Comprehension test, 9 students scored between 20-30 and the other 4 scored between 31-40. Of the 13 students that took the Punjabi version, 10 scored between 31-40 and 3 scored between 22-30.

## **CONCLUSIONS**

As expected, the results suggested that the phonological-based skills of DHH students were comparable to their grade-matched hearing peers in Punjabi but not in English; that is, on the Punjabi version of the PDT, the DHH students had an average of 131 and the matched hearing students had an average of 142; whereas on the English version, the DHH students performed at an average of 73, which was significantly below their hearing peers who had an average of 123. However, it was inconclusive on whether or not there was an impact of having knowledge of a phonetic language such as Punjabi supporting the learning of the English phonology.

The TOSWRF was given to all participants who took the English assessment. The hearing participants outperformed the DHH participants in this reading fluency measurement with an average of 125 versus an average of 78. Comparing to the norm, all DHH participants were performing significantly below grade level.

For the Passage Comprehension of the WJ-III assessment, while the average score for the DHH students was 22 and the average score for Hearing students was 26 in English, the hearing students had an average of 33 and the DHH students had an average of 20 in Punjabi.

When comparing the hearing students' performance on these assessments to those of the DHH students, it is fair to conclude that the hearing students demonstrated higher skills on all three assessments, but the gap in phonological-based skills was less significant than the others. We can infer from this data that the opaque English language has more complex phonemes and students experienced greater difficulty decoding those phonemes than those from the simple, transparent Punjabi language.

The assessment with the widest gap between the DHH students and their hearing peers was certainly the Passage Comprehension Test, particularly in Punjabi. A possible explanation for this inverse result may be lack of exposure to both the Punjabi Sign Language and spoken Punjabi. Punjabi Sign Language is currently being developed by

both the educators and students at the Bhagat Puran Singh School for the Deaf, but since the school was only born in 2005, there is less than ten years of this manual communication system exposure to these individuals. Spoken Punjabi is also unavailable to the DHH students due to severity of hearing loss and lack of amplification and assistive listening technology.

Researcher error was made in this study by only giving each student in a randomly assigned language to assess as opposed to assessing both languages. It would be interesting in future studies to compare how individual student performs on reading assessments in both English and Punjabi.

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